Nomination of invited plenary and sectional speakers for ICM 2010

The Program Committee for the International Congress of Mathematicians 2010 in Hyderabad, India, August 19-27, 2010 has been set up. According to the PC/OC Guidelines the Program Committee has chosen the core panels for the ICM 2010 sections. At this moment in time the Adhering Organizations of IMU and the mathematical societies the world over are invited to nominate invited plenary and sectional speakers.

Attached to this circular letter please find the list of the ICM 2010 sections. When you make nominations for speakers please specify whether you suggest them as plenary speakers or section speakers. In case of proposals of section speakers please indicate to which sections you would like the persons to be invited.

All communication concerning the scientific program of ICM 2010 is handled by the Chair of the Program Committee. Please direct all your mail with proposals for invited plenary and sectional speakers to Prof. Hendrik W. Lenstra, and please use the special e-mail address for this purpose hwlicm@math.leidenuniv.nl.

Sincerely

Martin Grötschel

Encl.
Description and definitions of the ICM 2010 sections, as well as the number of lectures to be given in each section.

Total number of lectures (including panel discussions): 150-176.

1. Logic and foundations (4-5 lectures)
   Connections with sections 2, 3, 14, 15.

2. Algebra (6-7 lectures)
   Groups and their representations (except as specified in 5 and 7). Rings, algebras and modules (except as specified in 7). Algebraic K-theory. Category theory.  
   Computational algebra and applications.  
   Connections with sections 1, 3, 4, 5, 6, 7, 14, 15.

3. Number theory (10-12 lectures)
   Computational number theory and applications, notably to cryptography.  
   Connections with sections 1, 2, 4, 7, 12, 14, 15.

4. Algebraic and complex geometry (9-11 lectures)
   Algebraic varieties, their cycles, cohomologies and motives (including positive characteristics). Schemes. Commutative algebra. Low dimensional varieties.  
   Real algebraic and analytic sets. Rigid and p-adic analytic spaces. Tropical geometry.  
   Connections with sections 2, 3, 5, 6, 7, 8, 14, 15.

5. Geometry (10-12 lectures)
   Local and global differential geometry. Geometric PDE and geometric flows. 
   Connections with sections 2, 4, 6, 7, 8, 9, 10, 11, 12.

6. Topology (10-12 lectures)
   Algebraic, differential and geometric topology. Floer and gauge theories. Low-dimensional including knot theory and connections with Kleinian groups and Teichmüller theory. Symplectic and contact manifolds. Topological quantum field theories.  
   Connections with sections 2, 4, 5, 7, 8, 9, 12.
7. **Lie theory and generalizations** (8-10 lectures)
   
   Algebraic and arithmetic groups. Structure, geometry and representations of Lie groups and Lie algebras. Related geometric and algebraic objects, e.g. symmetric spaces, buildings, vertex operator algebras, quantum groups. Non-commutative harmonic analysis. Geometric methods in representation theory. Discrete subgroups of Lie groups. Lie groups and dynamics, including applications to number theory.
   
   Connections with sections 2, 3, 4, 5, 6, 8, 9, 10, 12, 13, 14.

8. **Analysis** (7-8 lectures)
   
   Classical analysis. Special functions. Harmonic analysis. Complex analysis in one and several variables, potential theory, geometric function theory (including quasi-conformal mappings), geometric measure theory. Applications.
   
   Connections with sections 5, 6, 7, 9, 10, 11, 12, 16.

9. **Functional analysis and applications** (5-6 lectures)
   
   
   Connections with sections 5, 6, 7, 8, 10, 11, 12, 13.

10. **Dynamical systems and ordinary differential equations** (9-11 lectures)
    
    Topological and symbolic dynamics. Geometric and qualitative theory of ODE and smooth dynamical systems, bifurcations and singularities. Hamiltonian systems and dynamical systems of geometric origin. One-dimensional and holomorphic dynamics. Multidimensional actions and rigidity in dynamics. Ergodic theory including applications to combinatorics and combinatorial number theory.
    
    Connections with sections 5, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17.

11. **Partial differential equations** (9-10 lectures)
    
    
    Connections with sections 5, 8, 9, 10, 12, 16, 17, 18.

12. **Mathematical physics** (10-12 lectures)
    
    Quantum mechanics. Quantum field theory. General relativity. Statistical mechanics and random media. Integrable systems. Electromagnetism, String theory, condensed matter, fluid dynamics, multifield physics (e.g. fluid/waves, fluid/solids, etc.).
    
    Connections with sections 4, 5, 6, 7, 8, 9, 10, 11, 13.

13. **Probability and Statistics** (12-13 lectures)
    
Connections with sections 3, 5, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18.

14. **Combinatorics** (7-8 lectures)
Combinatorial structures. Enumeration: exact and asymptotic. Graph theory.
Probabilistic and extremal combinatorics. Designs and finite geometries. Relations
with linear algebra, representation theory and commutative algebra. Topological
and analytical techniques in combinatorics. Combinatorial geometry. Combinatorial
number theory. Polyhedral combinatorics and combinatorial optimization.
Connections with sections 1, 2, 3, 4, 7, 10, 13, 15.

15. **Mathematical aspects of computer science** (6-7 lectures)
Complexity theory and design and analysis of algorithms. Formal languages.
Semantics and verification of programs. Symbolic computation. Quantum
computing. Computational geometry, computer vision.
Connections with sections 1, 2, 3, 4, 7, 10, 13, 15.

16. **Numerical analysis and scientific computing** (5-6 lectures)
Design of numerical algorithms and analysis of their accuracy, stability and
complexity. Approximation theory. Applied and computational aspects of harmonic
analysis. Numerical solution of algebraic, functional, differential, and integral
equations. Grid generation and adaptivity.
Connections with sections 8, 10, 11, 13, 15, 17, 18.

17. **Control theory and optimization** (6-7 lectures)
systems and control. Optimal control. Optimal design, shape design. Linear, non-
linear, integer, and stochastic programming. Applications.
Connections with sections 10, 11, 13, 16, 18.

18. **Mathematics in science and technology** (8-10 lectures)
Mathematics applied to the physical sciences, engineering sciences, life sciences,
social and economic sciences, and technology. Bioinformatics. Mathematics in
interdisciplinary research. The interplay of mathematical modeling, mathematical
analysis and scientific computation, and its impact on the understanding of
scientific phenomena and on the solution of real life problems.
Connections with sections 11, 13, 16, 17.

19. **Mathematics education and popularization of mathematics**
(3 lectures + 3 panel discussions)
All aspects of mathematics education, from elementary school to higher education.
Mathematical literacy and popularization of mathematics. Ethnomathematics.

20. **History of Mathematics** (3 lectures)
Historical studies of all of the mathematical sciences in all periods and cultural
settings.